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Question-and-Answer Session With Crewmembers of the International Space Station and Space Shuttle *Endeavour*

February 17, 2010

The President. Hey, guys.

[*At this point, several seconds went by without a response. The President then placed his hand over the receiver of the telephone and addressed the event participants.*]

The President. There's a little bit of a delay, guys. They told you that, that there's a little bit of a delay?

Commander George D. Zamka. Good morning from the International Space Station and from the Space Shuttle *Endeavour*, Mr. President.

The President. Well, it's great to talk to you guys. I wanted to, first of all, just say that we've got a bunch of very excited young people here with us, along with a bunch of somewhat excited teachers. [*Laughter*] We have one engineer and one Member of Congress, so you've got a—and a whole bunch of press here, so it's a pretty motley crew—and one President.

But I just wanted to let you guys know how proud we are of all of you and what you guys have been accomplishing. I've had a chance to take a look at what the Tranquility module is doing. Everybody here back home is excited about this bay on the world that you guys are opening up, and Stephen Colbert, at least, is excited about his treadmill. [*Laughter*]

And so we just wanted to let you know that the amazing work that's being done on the International Space Station, the—not only by our American astronauts but also our colleagues from Japan and Russia, is just a testimony to human ingenuity, a testimony to extraordinary skill and courage that you guys bring to bear, and is also a testimony to why continued space exploration is so important, and is part of the reason why my commitment to NASA is unwavering.

But instead of me doing all the talking, I wanted you guys to maybe let us know what this new Tranquility module will help you accomplish. One of the things that we've done with our NASA vision for the future is to extend the life of the—our participation in the space station. And so we just want to get a sense of the kind of research that you guys are doing, and then maybe I'll turn it over to some young people to see if they've got any questions.

Commander Zamka. Well, thank you very much, Mr. President. It is a large team effort. In front of you, you have the joint crew of *Endeavour* and the space station, and we are the ones that are fortunate enough to be able to accomplish this great mission together in space. But there are many thousands of people around the world that gave the best of themselves over many years in order to have the days that we've been having up here.

For your question, I'm going to turn it over to ISS Commander Jeff Williams.

International Space Station's Tranquility Module

Commander Jeffrey N. Williams. Well, Mr. President, as you know, the ISS has been under assembly for many years, over a decade now. And as George said, it's because of the efforts of thousands of people around the world among the international partnerships.

And we're—this—the arrival of this module means several things. It means, of course, that we—everybody's aware of this new grand view that we have of the world below us, and that brings a special significance. But the Tranquility module also is going to serve as a gym, as a hygiene area, as a place a crew can maintain themselves for a long duration. And a long duration living and working in space is what the space station is all about, to do the research and the science necessary to take us beyond Earth orbit.

That was the ultimate purpose of the space station, and the arrival of this module will enable us to do that. And it really marks the end of the major assembly of at least the U.S. orbiting segment to—as we transition into full utilization of this magnificent orbiting laboratory.

Experiments

The President. Do you guys want to just mention some of the research and experiments that you can conduct in—on the space station that you could not be doing back here at home?

Flight Engineer Timothy J. Creamer. That's a great question, Mr. President. Let me start off by saying, one of the nice things about where we physically are right now is that we remove the effects of gravity, so we're able to do experiments that involve the effect of gravity, basically, on Earth as we look at what happens with the absence of it.

For instance, when you do combustion studies, flames on Earth burn in a teardrop fashion because the air comes in from underneath it and feeds the flame, but we can't do that here since the air doesn't know where up is, there's no convection. So the flames burn very purely in a ball.

In a similar sense, when we do cellular research for even, like for cancer research, for instance, on Earth, the cells actually collapse under their own weight, and so it—their growth on Earth are a little bit distorted. Here, without the gravity effect, we can grow cells very purely and understand the mechanisms by which that—they are replicating.

We're also doing metallic research and materials research to help us understand how to make materials on Earth better, but also to find out what materials are better for long-duration missions and traveling beyond Earth's orbit.

Some of the other experiments involve biological, where we actually have, for instance, butterflies up here, and we watch the life process of the butterflies. Many, many experiments up and down the stack are quite exciting when we are able to remove the variable of gravity.

The President. Well, the—some of the things that you talked about are in line with where we want to see NASA going increasingly: What are those transformational technologies that would allow us to potentially see space travel of longer durations? If we want to get to Mars, if we want to get beyond that, what kinds of technologies are going to be necessary in order for us to make sure that folks can get there in one piece and get back in one piece and that the kinds of fuels that we use and the technologies we use are going to facilitate something that is actually feasible? And we're very excited about the possibilities of putting more research dollars into the—some of these transformational technologies.

So we're excited about what you're doing and what folks back on Earth as part of NASA's engineering teams and scientific teams are doing.

What I want to do is give some of these young people a chance to ask a couple of questions. I'm—but I'm not sure I've got any volunteers, so I'm going to have to turn around—

oh, look, I—[*laughter*]—this is a serious bunch here, I can tell. So I'm going to hand the phone over to the first one—hold on—what's your name?

Q. Ruth.

The President. This is Ruth, coming from North Carolina.

Importance of Space Exploration

Q. What are some of the benefits of exploring space as opposed to exploring other places on Earth?

The President. Okay. That's a pretty serious question, guys. You better have a good answer. The NASA folks are sitting here listening. [*Laughter*]

Mission Specialist Stephen K. Robinson. Ruth, I can tell you your curiosity reaches far, and so does ours. And that's sort of the human spirit, to find out what can humans really do.

And one thing that's always been, I think, amazing to every person who travels in space is that the human body is adaptable to this environment. But adaptable in what way, and how does the human body and even the human brain adapt to this very, very different environment? Learning about how we, ourselves, work and how we can handle changes if we go somewhere very different than what we're used to is something that's valuable also on Earth, because our environment changes on Earth too; and in terms of health and medicine, we understand better how our own bodies work. So there's a lot to be learned.

The President. All right, who's next?

Q. Mary.

The President. All right, this is Mary coming at you.

Inspiration to Become Astronauts

Q. What inspired you to become an astronaut?

The President. Got any takers on that one?

Mission Specialist Nicholas J.M. Patrick. Mary, hello, this is Nick Patrick. The thing that inspired me to become an astronaut was watching the Apollo moon landings many, many years ago with my parents. I thought I wanted to be a space explorer then, and I stuck to my dream. I stayed in school and I studied hard, and through schoolwork and also an interest in things like sailing and flying I was able to realize my dream.

So I would have some advice to all of you there, which is, study really hard in school, listen to your teachers. They're full of knowledge and experience that you really can use in whatever path your future life takes you along, whether it be engineering, science, a job in business, or even space exploration.

The President. All right, let's get—we've one of our young people from——

Q. From Nebraska.

The President. From Nebraska. And what's your name?

Q. Jordan.

The President. This is Jordan from Nebraska.

Artificial Gravity

Q. Do you think it would ever be possible to create artificial gravity in space?

The President. That's a big physics question there, guys. Anybody want to tackle that one?

Pilot Terry W. Virts, Jr. Hi, Jordan, this is Terry Virts here. And that's a great question, because one of the hard things about long-duration space flight is the human body dealing with weightlessness and a lack of gravity.

And one way you can create gravity is to spin things. If you take a bucket of water or paint you can spin it around, and you'll notice that the water stays pressed up against the bucket because you're accelerating it. And so you can artificially create that acceleration that makes you feel like you're in gravity just by rotating something like a centrifuge.

So it is possible, but to do that it requires a really large structure. And so that's something that we haven't done here on the space station, but that's one way you could do it.

The President. That was a great question. All right, we've got—we need a Michigan; we got to make sure every State is represented here. What's your name?

Q. Shanae.

The President. Okay, go ahead and introduce yourself, Shanae.

Training to Become an Astronaut

Q. I was just wondering, what kind of training did you have to go through before you were able to get into space?

The President. That was Shanae from Michigan.

Mission Specialist Kathryn P. Hire. Well, that's a great question. You know, it takes a lot of experience to be an astronaut, and it's not just in one field. We've all been through many, many years of school, but also experience in our own fields. So we have engineers, scientists, mathematicians, medical doctors, and physicists. We have quite a range of experience that become astronauts.

And the important thing is that you have a good, solid background in the technical fields—the science, the technology, the engineering, and the math—to build on that, because once everyone comes and is selected as an astronaut, we all train generically for space flight, and then we train specifically for our mission.

For the International Space Station, it's a very complicated and very large spacecraft, so the training is over multiple years just for a specific flight. For the space shuttle, being a shorter duration flight of just a couple of weeks, we still train for over 1 year just specifically on the tasks that we'll accomplish on our mission.

So it's quite a bit of time, but it certainly is worth it. It's quite rewarding to us to be able to execute the mission that we've been training for for so long.

The President. And I think we need to have at least one Floridian; is that right?

Q. [*Inaudible*]

The President. We already had a Floridian? Do we have every State covered so far here?

All right, we've got time for a couple more questions. We were going to get a little gender balance here. [*Laughter*] This young man back here, what's your name?

Q. Joseph.

The President. Joseph. Hold on one second. You've got a question from Joseph from Nebraska.

Viewing Earth's Landmarks From Space

Q. Are there any recognizable landmarks that you can see from space?

The President. Yeah, the rumor was, is that you can see the Great Wall from space, but I'm not sure that's true. So are there at least—if there aren't manmade landmarks, are there some natural landmarks other than continents that you can see?

Flight Engineer Soichi Noguchi. Yes, Mr. President and Joseph, that's a great question. Actually, the—one of the great achievement in this mission, we have a great window, big window, that we are really fascinated by the great view of the Earth. And, yes, we can see a lot of great landmarks. We can see the Golden Gate Bridge, the great skyscrapers in New York, and the Grand Canyon is just breathtaking. And also while in the night pass we can see all the lights. That means that the humans are active even in the night. And this is a great benefits that we all benefit from, being in space.

The President. Well, there you go.

All right, we've got—looks like I've got a couple more questions. Hold on. What's your name?

Q. Barbara.

The President. This is Barbara. From?

Q. Florida.

The President. From Florida. Hold on.

Living in Space

Q. Hi, I'm curious about the thoughts and emotions that you guys feel when you're in space.

The President. There you go. Do you start getting lonely? Do you feel a little claustrophobic? Vertigo?

Mission Specialist Robert L. Behnken. Well, that's an excellent question, and I think that probably it ranges quite a bit over the period of a space shuttle mission, and I expect it probably varies quite a bit over the range of a long-duration mission.

Kind of starting off, for the shuttle mission, at least for me—I've done that twice now—you kind of get into orbit, and you're just kind of finding the equivalent of your sea legs, if you will. And so you're—you've arrived on orbit, and you kind of have a feeling of joy, having accomplished it. Your body has just gone through kind of a little bit of a violent experience through the launch, and you have a little bit of adrenaline probably getting out of your system. So it's a little bit of a joyous, giddy moment at the same time that you're disoriented as you deal with the first couple of hours of actually being on orbit.

After that passes, after a couple of days, it—for me it was kind of a sense of wonder as you explore what you can do in zero gravity and the things that you can see out the window and just how the entire complex works together to make it happen. So it's just a sense of wonder.

After—a little while after that, I think you start to think a little bit about the people who are back on Earth that are most precious to you, and then that little bit of loneliness can kick in. And one of the really nice things that we have and the long-duration crews have is the opportunity to use a telephone or to perform a videoconference, similar to like we're doing with you guys, with our families. And I think that's really important for folks to maintain that contact when you're up here on orbit.

Of course, you have your crewmembers, but you do really want to maintain those precious relationships with all your family members and friends that are on the ground. And they do a remarkable job actually supporting us while we're in space to make sure that we can still speak with our families and that our families are informed and able to stay in contact with us.

But all those emotions kind of wrap up together. Kind of the final one is kind of when you do return to Earth and kick off all those relationships that, whether they were 2 weeks or 6 months later, have—time has passed, and you have to kind of rebuild them a little bit. But it's a very joyous experience and a—something that you can share with both the people on the ground and the people who are part of your crew throughout the entire mission.

Great question.

The President. All right. All right, so I think we're going to make this the last question. Have we been keeping you guys overtime? So what's your name?

Q. Alex.

The President. This is Alex. Hold on one sec.

View of Earth's Climate From Space

Q. Does being up in space allow you to see things such as the weather? Like, could you see the storm over Washington?

The President. That's a good point. Obviously, we're using a lot of satellite imagery these days, and this is going to be a major focus of some of the work NASA's doing here at home, thinking about how we can get better information about our own climate. Is that something that you guys are tracking from the space station?

Commander Williams. Well, we view a lot of the weather phenomena. We've seen many hurricanes and typhoons and whatnot around the world. We can see fronts crossing continents. We see the whole variety of cloud formations. We sometimes can see the aftermath of a storm or other major impact on the Earth after the sky clears.

So there's a whole lot of details that we can see here from the space station and observe every day. We can see things—we pass over the same portion of the Earth every day, so it's a regular observation that we can make over a period—a long period of time as well.

The President. Well, listen, you guys have been extraordinarily generous with your time. I just want to repeat—and I think I speak for all the young people here and everybody back home—how proud we are of you, how excited we are about the work that's being done on the space station, and how committed we are to continuing human space exploration in the future.

So you guys continue to be great pioneers and great role models for all of us, and we thank you for your courage. And tell your families we appreciate them letting you float up into space like this. [*Laughter*] All right?

Bye-bye, guys.

NOTE: The President spoke at 5:20 p.m. via satellite in the Roosevelt Room at the White House. In his remarks, he referred to entertainer Stephen T. Colbert.

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